

Listing of the Claims

The Listing of the Claims replaces all prior versions and listings of claims in the application.

1-17. (Previously Withdrawn)

18. (Currently Amended) A method of identifying a modulator of a lepidoptera calcium channel protein activity comprising the steps of:

a) performing a positive test assay by

i) contacting a first test cell [that comprises] comprising a functional calcium channel with a first solution containing calcium and a test compound, wherein the first test cell comprises at least one of

i) a recombinant expression vector [that comprises] comprising a nucleotide sequence that encodes a chimeric TBW voltage-gated calcium channel $\alpha 1$ subunit,

ii) a recombinant expression vector [that comprises] comprising a nucleotide sequence that encodes a TBW voltage-gated calcium channel β subunit, and

iii) a recombinant expression vector [that comprises] comprising a nucleotide sequence that encodes a TBW voltage-gated calcium channel $\alpha 2\delta$ subunit

wherein said first test cell expresses a functional calcium channel, [with a solution containing calcium in the presence of a test compound,] and

ii) detecting the amount of intracellular calcium in said first test cell;

b) performing a negative control assay by

i) contacting a negative control test cell [that comprises] comprising a functional calcium channel with a second solution containing calcium in the absence of said test compound, wherein the negative control test cell comprises at least one of

i) a recombinant expression vector that comprises a nucleotide sequence that encodes a chimeric TBW voltage-gated calcium channel $\alpha 1$ subunit, ii) a recombinant expression vector that comprises a nucleotide sequence that encodes a TBW voltage-gated calcium channel β subunit, and iii) a recombinant expression vector that comprises a nucleotide sequence that encodes a TBW voltage-gated calcium channel $\alpha 2\delta$ subunit, and wherein said negative control test cell expresses a functional calcium channel, [with a solution containing calcium in the absence of said test compound], and c) detecting the amount of intracellular calcium in said negative control test cell; and d) comparing the amount of intracellular calcium in said positive control test cell to the amount of intracellular calcium in said negative control test cell, wherein a change in the amount of intracellular calcium in said positive control test cell compared to the amount of intracellular calcium in said negative control test cell indicates the test compound is a modulator of calcium channel activity.

19. (Currently Amended) The method of claim 18 wherein the test cell is a *Xenopus* oocyte cell, a CHO cell, or an HEK cell.

20. (Currently Amended) The method of claim 18 wherein detecting the amount of the intracellular calcium [is detected by] comprises using an assay in which fluorescence generated by dye inside of said test cell interacting with intracellular calcium is measured.

21. (Currently Amended) The method of claim 18 further comprising performing a second-type positive control test assay by a) contacting [a] the positive control test cell [which comprises] comprising a functional lepidoptera calcium channel, with a third solution containing calcium in the absence of said test compound and in the presence of a lepidoptera calcium channel agonist, and

b) detecting the amount of intracellular calcium in said second-type positive control test cell.

22. (Currently Amended) The method of claim 21 wherein the lepidoptera calcium channel is a [lepidoptera] heliiothis calcium channel.

23. (Currently Amended) The method of claim 18 further comprising [the step of]

d) performing a second-type negative control assay by

i) contacting a negative control test cell that does not express a functional lepidoptera calcium channel with a second solution containing calcium in the absence of said test compound, and

ii) detecting the amount of calcium taken up by said lepidoptera calcium channel second-type negative control test cell; and/or

e) performing a third-type negative control assay by

i) contacting a negative control test cell that does not express a functional lepidoptera calcium channel with a solution containing calcium in the absence of said test compound and in the presence of a lepidoptera calcium channel agonist, and

ii) detecting the amount of calcium taken up by [said calcium channel] the negative control test cell.

24. (Currently Amended) The method of claim 23 wherein the lepidoptera calcium channel is a heliiothis calcium channel.

25. (Currently Amended) [The method of claim 18] A method of identifying a modulator of a lepidoptera calcium channel protein activity comprising the steps of:

a) performing a positive test assay by

i) contacting a first test cell comprising a functional lepidoptera calcium channel with a first solution containing calcium in the presence of a test compound, the functional lepidoptera calcium channel comprising at least one of:

- i) a recombinant expression vector comprising a nucleotide sequence that encodes a chimeric TBW voltage-gated calcium channel $\alpha 1$ subunit [, wherein the chimeric TBW voltage-gated calcium channel $\alpha 1$ subunit comprises] comprising SEQ ID NO: 2[, a mutant thereof, and a fragment thereof];
- ii) a recombinant expression vector comprising a nucleotide sequence that encodes a TBW voltage-gated calcium channel β subunit, the TBW voltage-gated calcium channel β subunit [comprises] comprising SEQ ID NO: 8, SEQ ID NO: 10, or SEQ ID NO: 12, [a mutant thereof, and a fragment thereof]; and
- iii) a recombinant expression vector comprising a nucleotide sequence that encodes a TBW voltage-gated calcium channel $\alpha 2\delta$ subunit, [and] the TBW voltage-gated calcium channel $\alpha 2\delta$ subunit [comprises] comprising SEQ ID NO: 16[, or SEQ ID NO: 18[, a mutant thereof, and a fragment thereof]; and
- ii) detecting the amount of intracellular calcium in the first test cell;
- b) performing a negative control assay by
- i) contacting a second test cell that comprises a functional lepidoptera calcium channel with a second solution containing calcium in the absence of the test compound, the second test cell comprising at least one of
- i) a recombinant expression vector comprising a nucleotide sequence that encodes a chimeric TBW voltage-gated calcium channel $\alpha 1$ subunit comprising SEQ ID NO: 2;
- ii) a recombinant expression vector comprising a nucleotide sequence that encodes a TBW voltage-gated calcium channel β subunit comprising SEQ ID NO: 8, SEQ ID NO: 10, or SEQ ID NO: 12; and
- iii) a recombinant expression vector comprising a nucleotide sequence that encodes a TBW voltage-gated calcium channel $\alpha 2\delta$ subunit comprising SEQ ID NO: 16 or SEQ ID NO: 18; and

wherein the negative control test cell expresses a functional lepidoptera calcium channel, and
ii) detecting the amount of intracellular calcium in the negative control test cell; and
c) comparing the amount of intracellular calcium in the positive control first test cell to the amount of intracellular calcium in the negative control second test cell wherein a difference in the amount of calcium in the positive control first test cell compared to the amount of intracellular calcium in the negative control second test cell indicates that the test compound is a modulator of calcium channel activity.

26. (Currently Amended) The method of claim 25 wherein the test cell is a *Xenopus* oocyte cell, a CHO cell, or HEK cell.

27. (Currently Amended) The method of claim 25 wherein detecting the intracellular calcium [is detected by] comprises using an assay in which fluorescence generated by dye inside of said cell interacting with intracellular calcium is measured.

28. (Currently Amended) The method of claim 25 wherein said functional calcium channel comprises

- a) a chimeric TBW voltage-gated calcium channel $\alpha 1$ subunit that comprises SEQ ID NO: 2;
- b) a TBW voltage-gated calcium channel β subunit that comprises SEQ ID NO: 8, SEQ ID NO: 10, or SEQ ID NO: 12; and
- c) a TBW voltage-gated calcium channel $\alpha 2\delta$ subunit that comprises SEQ ID NO: 16 or SEQ ID NO: 18.

29. (Currently Amended) The method of claims 28 wherein [that] the chimeric TBW voltage-gated calcium channel $\alpha 1$ subunit comprises SEQ ID NO: 6.

30. (Currently Amended) The method of claim 28 wherein

- a) the nucleic acid sequence that encodes the chimeric TBW voltage-gated calcium channel α 1 subunit [that] comprises SEQ ID NO: 1;
- b) the nucleic acid sequence that encodes the TBW voltage-gated calcium channel β subunit comprises SEQ ID NO: 7, SEQ ID NO: 9_a or SEQ ID NO: 11; and
- c) the nucleic acid sequence that encodes the TBW voltage-gated calcium channel α 2 δ subunit comprises SEQ ID NO: 15 or SEQ ID NO: 17.

31. (Currently Amended) The method of claim [30] 28 wherein the nucleic acid sequence that encodes the chimeric TBW voltage-gated calcium channel α 1 subunit [that] comprises SEQ ID NO: 5.

32-43. (Previously Withdrawn)